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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,334	06/30/2003	John Heck	42P16325	3715
8791 7590 03/08/2007 BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030			EXAMINER LEE, HSIEN MING	
			ART UNIT	PAPER NUMBER
			2823	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/08/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/611,334

Applicant(s)

HECK ET AL.

Examiner

Hsien-ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 9-12, 14 and 16-19 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8, 13, 15 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/30/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE  
PRIMARY EXAMINER

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings (Figs. 1, 2 and 6) are objected to because lines and reference numbers are not uniform. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

~~A person shall be entitled to a patent unless—~~

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 7, 9-12, 14 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuo et al. (US 6,630,725).

In re claim 1, Kuo et al., in Figs. 2-5 and corresponding text, teach a method of manufacturing a plurality of MEMS devices comprising:

- aligning a plurality of MEMS dice formed on a first substrate 210 with a plurality of non-silicon caps 231 and 232 having at least one electrical via 251~254 (Fig.2); and
- bonding the plurality of MEMS dice with the plurality of non-silicon caps 231 and 232 to form a plurality of MEMS devices 221 and 222, the plurality of MEMS devices 221 and 222 having an interior and an exterior, wherein the electrical via 251~254 extends from the interior to the exterior (Fig.4).

In re claim 2, Kuo et al. teach bonding of the plurality of MEMS devices 221 and 222 with the plurality of non-silicon caps 231 and 232 hermetically seals the plurality of MEMS devices 221 and 222 (Fig.4).

In re claim 3, Kuo et al. teach dicing the plurality of MEMS devices 221 and 222 (Fig.5).

In re claim 4, Kuo et al. teach bonding one of the plurality of MEMS devices 621 or 622 to an integrated circuit chip 681 or 682 (Fig.6).

In re claim 7, Kuo et al. teach that the bonding of the plurality of MEMS devices 221 and 222 with the plurality of non-silicon caps 231 and 232 is achieved by solder bonding via solders 311~316 (Fig.4).

In re claim 9, Kuo et al., in Figs. 2-5 and corresponding text, teach an apparatus comprising:

- a plurality of MEMS dice formed on a substrate 210; and

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- a plurality of caps 231 and 232 bonded to the plurality of MEMS dice, the plurality of caps 231 and 232 having at least one electrical via 251~254 extending from a first side (i.e. the interior) of the plurality of caps 231 and 232 to a second side (i.e. the exterior) of the plurality of caps 231 and 232.

In re claim 10, Kuo et al. teach that one of the plurality of MEMS dice 210 and one of the plurality of caps 231 and 232 forms a device interior and a device exterior, and the electrical via 251~254 extends from the device interior to the device exterior (Fig.4).

In re claim 11, Kuo et al. teach that the plurality of caps 231 and 232 comprises ceramic ( i.e. electrically insulative material, col. 3, lines 21-22).

In re claim 12, Kuo et al. teach that the plurality of caps 231 and 232 are formed on a common substrate (Fig.2).

In re claim 14, Kuo et al. teach that the electrical via is coupled to a solder ball (col. 5, lines 14-16) on the device exterior.

In re claim 16, Kuo et al. teach an apparatus comprising:

- a MEMS die formed on a semiconductor substrate 210;
- a ceramic cap 231/232 bonded to the MEMS die 210 to form a hermetically sealed interior, the ceramic cap having at least one electrical via 251~254 extending from a hermetically sealed interior through the ceramic cap to an exterior (Fig.4).

4. Claims 16-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Heck et al. (US 7,170,155).

In re claim 16, Heck et al., in Fig.1 and corresponding text, teach an apparatus comprising:

- a MEMS die 102 formed on a semiconductor substrate;

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- a ceramic cap 104 bonded to the MEMS die 102 to form a hermetically sealed interior, the ceramic cap having at least one electrical via 118 and 120 extending from a hermetically sealed interior through the ceramic cap 104 to an exterior.

In re claim 17, Heck et al., in Fig.1 and corresponding text, teach that the at least one electrical via 118 or 120 is coupled to a solder ball 114 or 116 on the exterior.

In re claim 18, Heck et al., in Fig.1 and corresponding text, teach that a circuit board 106, wherein the circuit board 106 is electrically coupled to the MEMS die 102 by a solder ball 114 and 116 and the electrical via 118 and 120.

In re claim 19, Heck et al., in Fig.1 and corresponding text, teach that the apparatus comprises an integrated circuit chip 106, wherein the integrated circuit chip 106 is electrically coupled to the MEMS die 102 by a solder ball 114 and 116 and the electrical via 118 and 120.

***Allowable Subject Matter***

5. Claims 5, 6, 8, 13, 15 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

None of the prior art of record, either alone or combination, teaches or suggests using thermocompression bonding for bonding the plurality of MEMS dice and the plurality of non-silicon caps (claim 5); using gold-to-gold thermocompression bonding for bonding the plurality of MEMS dice and the plurality of non-silicon caps (claim 6); using eutectic bonding for bonding the plurality of MEMS dice and the plurality of non-silicon caps (claim 8); the plurality

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of caps are coupled to each other by a carrier (claim 13); and the plurality of caps comprises a zero-shrink ceramic (claims 15 and 20).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Monday, Tuesday and Friday (7:30 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hsien-ming Lee  
Primary Examiner  
Art Unit 2823

March 2, 2007

HSIEN-MING LEE  
PRIMARY EXAMINER

3/2/07